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**Fixed Income Management:  
Evolution or Revolution?**



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## Contents

Background.....	3
Traditional Approach to Fixed Income Portfolio Management.....	5
Separate Beta and Alpha Management to Achieve Clients' Total Fund Objectives .....	9
Accessing Fixed Interest Beta Risk and Return.....	9
Generating Meaningful Fixed Interest Alpha.....	12
Driving Fixed Interest Returns Harder .....	17
References .....	18

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## Background

In an increasingly competitive environment fund managers need to remain focused on meeting client objectives and being meaningful contributors to overall portfolio outcomes. While most investment institutions still rely on a framework developed in the 1990's, those that have moved away from the 'traditional' approach are able to achieve client objectives more effectively and most importantly, more efficiently.

The traditional approach was based around the concept of a relatively static Strategic Asset Allocation (SAA) and the use of a range of investment managers who are given narrow mandates to invest in specific assets and asset classes. As part of this traditional SAA, fixed income assets were used mainly as a risk reducing allocation within diversified balanced portfolios. Subsequently, the active return target was generally low and even when a fixed income manager strongly outperformed their benchmark, their weighted contribution at the client's total fund level was negligible.

Superannuation funds were also downweighting their fixed interest exposures to fund the newer asset classes such as alternatives (infrastructure, private equity) to increase diversification within a balanced portfolio. This encouraged fixed interest managers to remain meaningful through evolution from traditional investment management processes.

QIC contends that the traditional approach is less efficient and can lead to sub-optimal outcomes, jeopardising the ability of clients to meet their long term investment objectives. QIC advocates the independent construction of market exposures (beta) specifically aligned to medium-term objectives and independent to these beta allocations, active return generation (alpha) at a meaningful level.

## Global Fixed Income Markets

The world of fixed interest continues to evolve from traditional government and corporate bonds towards derivative instruments and market innovations which allow investors to target specific fixed interest risk premiums and structure a portfolio to effectively meet a variety of objectives. The evolution of fixed interest instruments over the past decade facilitates the delivery of scalable and capital efficient pure alpha strategies that can sit over any beta return.

Aside from currency markets, the fixed interest market is the largest securities market in the world, providing a wide (and ever increasing) range of investment options. Investors have typically held bonds in their portfolios for three reasons:

- Income: most bonds provide a level of 'fixed' income.
- Diversification: bonds and equities are generally lowly correlated (that is with interest rate risk, although over the recent past this correlation has increased with the expansion of credit markets).
- Protection against economic slowdown or deflation: in periods of strong economic growth, inflation typically rises and a fixed income portfolio's stream of income becomes less valuable – the converse applies in periods of weak economic growth or deflation.

The major sectors of the market are:

*Government bonds:* this is the largest global sector (over 60%) and includes:

- 'Sovereign' debt issued and backed by a central government.

- Agency and Semi-government bonds.
- Emerging market bonds: sovereign bonds issued by countries with developing economies.
- Inflation linked bonds: bonds typically issued by governments and linked to an inflation measure.

*Corporate Bonds:* the next largest sector (approx 20%) of the bond market comprises two broad categories and a broad range of credit ratings within each category:

- Investment-grade: higher credit quality and with lower credit default risk.
- High yield (speculative grade or 'junk' bonds), i.e. bonds issued by companies with a lower level of credit quality and high default risk and return characteristics.

*Mortgage and Asset Backed Securities* (approx 20%): An outcome of the process of 'securitisation', in which cash flows from various types of loans (for example, mortgage payments; car payments; credit card payments) are bundled and sold to investors as securities. The major types of loans are:

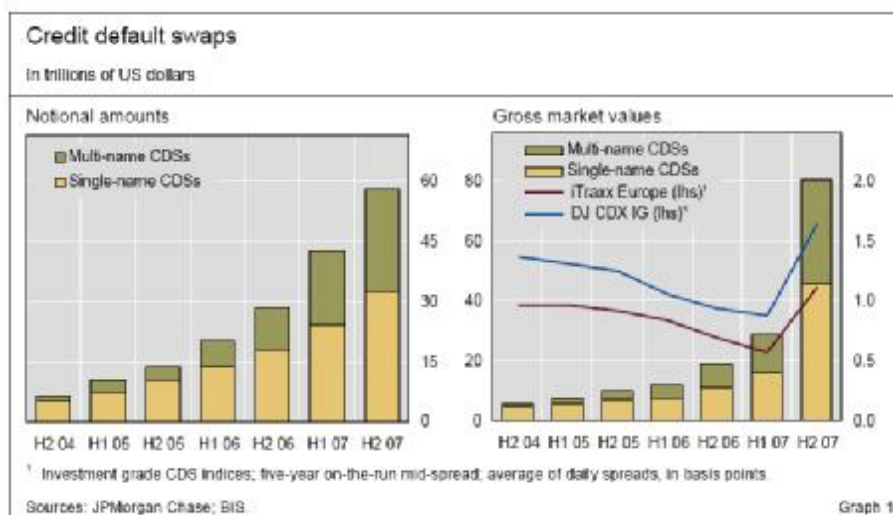
- Mortgage Backed Securities: mortgage payments of homeowners
- Asset Backed Securities: car payments, credit card payments and other loans

The non-government bonds above tend to be priced relative to a risk free rate such as government bond yields or the LIBOR rate.

## Growth in Fixed Income Synthetic Instruments

Fixed Income markets have a long history of development, innovation and evolution of new sub-asset classes and security types including derivatives. Underpinned by deep and broadening Fixed Income physical or cash markets, there has been strong growth and development in over-the-counter (OTC) derivative securities including interest rate swaps, inflation swaps and particularly rapid growth in credit default swaps (CDS), for example, multi-name and single-name credit default swaps. The Bank of International Settlements (May 2008) estimates that the notional outstandings in CDS at the end of 2007 was US\$58 trillion (Figure 1). These instruments provide the FI portfolio manager with additional options for gaining exposure to specific beta risk premia as well as provide increased breadth for alpha opportunities.

Figure 1 – Credit Default Swaps



## Traditional Approach to Fixed Income Portfolio Management

The traditional approach to active bond investment typically involves management of a dedicated fixed income portfolio relative to a specified benchmark. For Australian investors, the UBS Composite Index is the most popular benchmark. Active management entails managing portfolio risks within specified constraints in order to retain the overall market characteristics that the fund is also seeking. The focus of active risk management includes:

- The portfolio's duration and yield curve positions relative to benchmark.
- The credit quality of the portfolio relative to benchmark.
- The maturity structure of the portfolio, based on the expected changes in the relationship between bonds with different maturities.
- The mix of fixed interest asset classes and countries depending on the investor mandate.
- Tracking error.

### Problems With Fixed Interest Benchmarks?

In general, fixed interest benchmarks embody a number of complex issues. These issues arise because fixed income benchmarks are capitalisation weighted and all-inclusive. The two major inefficiencies relate to the duration problem and 'bums' problem.

The **duration problem** is the fact that the duration of the benchmark comes from issuer preferences and is not necessarily the duration that a given investor should hold. The proportions of bonds in short-, intermediate-, and long-term categories reflect the maturity or duration preferences of issuers, who are seeking to minimise their cost of capital. Moreover, an investor usually has specific time-horizon preferences that make one duration more advantageous than another. These preferences do not necessarily match those of issuers in the aggregate, whose preferences are reflected in the benchmark.

The **'bums' problem** is that the biggest debtors (whether companies or countries) have the largest weight in the benchmark – the biggest bums – and is not likely to be mean variance efficient. If you are tracking such a benchmark, when someone issues a security, you have to buy it in proportion to its capitalisation weight to minimise tracking error, even if the security is only marginally of high enough quality to make it into the index. Such securities would seem to be the most likely to be downgraded or to default. The bums problem applies to countries in an international sovereign bond benchmark just as it does to corporations.

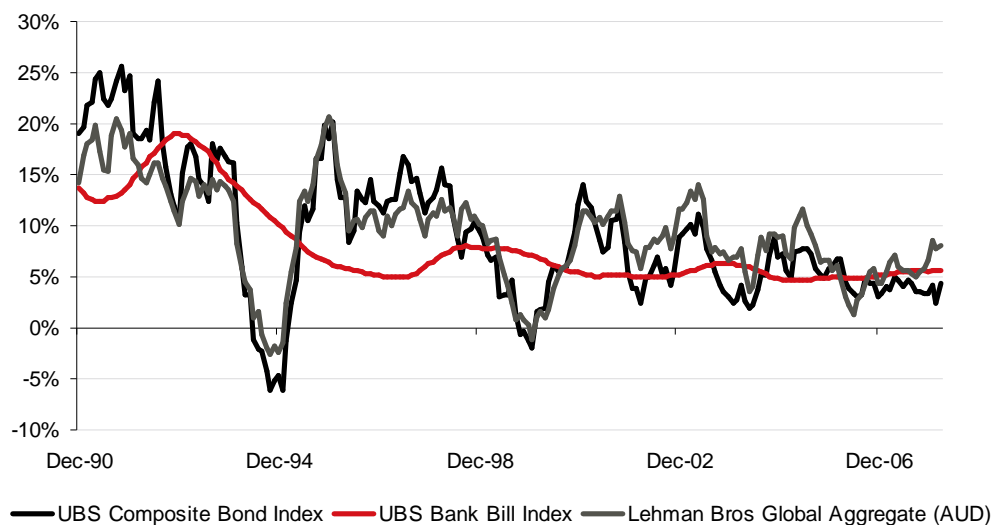
Another issue related to fixed income benchmarks arises from the recent growth in the size of the credit market. The recent trend is a reduction in the size of Treasury debt and an increase in corporate issues. This has the impact of making broad based bond benchmarks more exposed to tail events than they have been in the past.

## Bond Returns have Disappointed Australian Investors Recently

Over the past few years fixed interest market (beta) returns have disappointed Australian investors as the downward trend in inflation and falling interest rate environment abated. It is not unusual for 1 year Australian Bond Indices (UBS Composite Bond Index) returns to underperform cash. Figure 2 below illustrates the long term decline, then stability of cash returns, and falling of returns and volatility for the Australian and Global fixed interest benchmarks.

Figure 2 – Bond Benchmark Returns Versus Cash

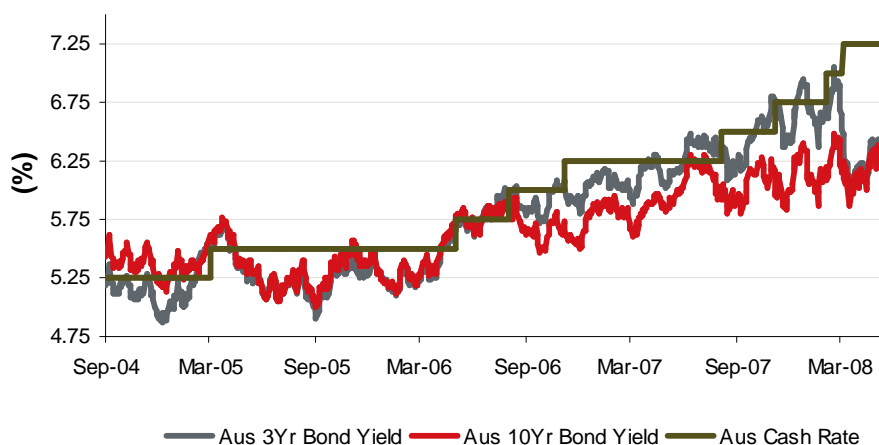
1 Year Rolling Returns: Cash (Bank Bills) Versus Australian (UBS) and Global Fixed Interest (LGA)



We can see (in Figure 3) that 3 and 10 year bond yields have spent much of the last three years yielding less than the cash rate. Over two years, the UBS Composite Bond Index has returned 3.69% pa and 3.74% over the year to 31 March 2008. The relatively low performance versus cash is attributable to an environment of rising interest rates and rising longer term yields on bonds.

Figure 3 – Australian Yields

Aus Cash, 3 Yr and 10 Yr Bond Yields



With the prospect of global inflation and interest rates being higher in the years ahead versus the previous decade, the potential for extended fixed income capital gains within traditional fixed income benchmarks will be limited. For investors focused on traditional benchmark returns this approach may represent a sub-optimal strategy.

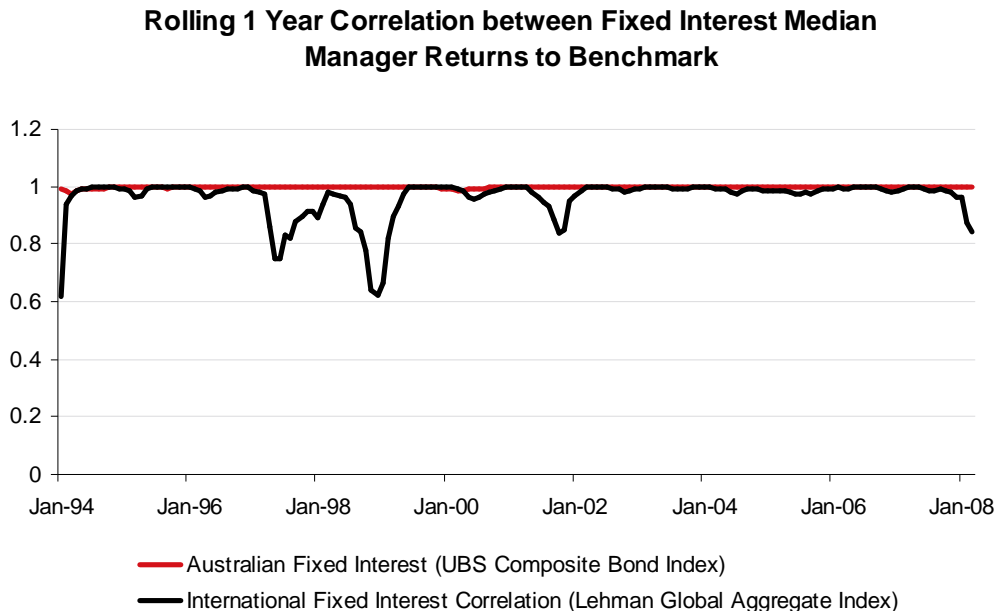
## Correlations of Manager Returns to Benchmarks

By analysing correlation of Fund returns to benchmarks we can also gain some perspective on the extent of risk being taken by managers away from benchmark.

If we examine the 12 month rolling correlations of the UBS Composite Bond Index (Australian benchmark) and the Lehman Global Aggregate Bond Index (Global, hedged in AUD) with the median fixed interest manager returns, the following observations can be made (refer Figure 4):

- There is very strong positive correlation between the benchmark and median manager returns for the Australian Fixed Interest universe<sup>1</sup>.
- There is greater variability in correlation between global benchmark and manager returns<sup>2</sup> compared to Australian fixed interest.
- Overall, active fixed income management has been minimised in traditional portfolios in the last decade.

Figure 4 – Correlation of Fixed Income Manager Returns to Benchmark



Source: Mercer, QIC – Based on 1994-2008 returns

<sup>1</sup> Mercer Survey of Australian Fixed Interest to 31 March 2008

<sup>2</sup> Mercer Survey of Global Fixed Interest (hedged in AUD) to 31 March 2008

Historical statistical analysis highlights that while fixed interest benchmark returns have been declining, many managers have struggled to outperform the benchmark. We believe that this is due to global investment managers implementing strategies that are tied to benchmark characteristics and often do not represent the optimal risk/return structure for investors.

## Can Fixed Interest Managers Deliver More For Clients?

The weaknesses we see to the traditional approach for fixed interest investment management are:

- A pre-occupation with benchmarks and a reluctance to hold significant allocations to assets which fall outside the benchmark.
- Strategic asset allocations tend to be static for long periods, even in the face of significant changes in market valuations.
- Active mandates are allocated in accordance with SAA weights so some managers are reduced to making insignificant contributions if they manage within an asset class which has a small allocation. The SAA does not reflect any fundamental belief that assets with higher SAA weights can provide a higher or more consistent return.
- Furthermore, active managers tend to be analysed by investors on an unweighted basis. For example, a Fixed Income Manager delivering an alpha of 50 basis points over index, irrespective of the portfolio weight in the total fund of the client. If a 10% weight to this manager then the alpha generated is 5 basis points at fund level and it is on this basis that active managers in the portfolio should be analysed. There is seldom any trade-off between a good equity manager and a good fixed interest manager as they vie for a share of the overall (alpha) risk budget.

The establishment of an investment framework of independent alpha and beta policy decisions to achieve long term client investment objectives will address these weaknesses.

Fixed interest markets have undergone significant change in the past few years. Market innovations and the emergence of new instruments available to fixed interest investors have allowed portfolios to be designed to meet a variety of investment objectives. Synthetic instruments can be used to manipulate the generic characteristics of fixed interest asset classes and target specific risk premia.

The unique characteristics of many bond issues with a wide range of options create many opportunities for investors with a broad spectrum of risk/return profiles. While these approaches are still very relevant for fixed interest managers, a broadening of the opportunity set and a separation of beta and alpha will increase a manager's ability to generate meaningful active returns at the total fund level.

We believe that over the medium term highly convicted fixed interest managers can deliver superior total return outcomes from a less restrictive mandate. However, the broader the mandate, the lower the strength of relationship between the Fund and the benchmark.

## Separate Beta and Alpha Management to Achieve Clients' Total Fund Objectives

Depending on composition and construction, fixed interest portfolios can provide significantly different risk and return outcomes to investors. For many portfolios QIC operates independent alpha and beta policies to better reflect the investment objectives of our clients. What does this mean?

Beta policy is developed to provide a market return stream (not necessarily a benchmark return). Typical allocations include setting sector exposures (for example, Government bonds, corporates, high yield, emerging markets), country allocation, credit limits, inflation exposure and overall duration. The structure of the beta or market portfolio should reflect the investment objective and risk preferences of the client. For example, for a liability focused investor (such as a defined benefit or insurance Fund) the impact of interest rates and inflation is an important factor in assessing scheme solvency. The asset portfolio can be constructed to broadly match the cash-flow requirements of the liability stream. For investors that use fixed income investments as a defensive allocation in a broader balanced portfolio the extent of protection that is provided should be considered. Typically, equity risk within a balanced portfolio represents 90% of total risk. If you allocate 25% of a multi sector fund to defensives and then use short duration bonds they will not make much difference in a stress scenario. A long duration portfolio (much longer than industry benchmarks) will be required to make any meaningful difference.

Alpha policy is aimed at constructing an absolute return portfolio that provides diversification (multiple alpha sources), a consistent return stream, and an outcome that is not tied to any changes to the beta portfolio. For example, in traditional portfolios the selection of benchmark virtually pre-determines the sources of alpha regardless of consideration of their quality. Over the medium term the alpha portfolio should not be subject to the directionality of markets. The ability to implement long/short strategies via derivatives allows skilled managers to outperform in all environments.

The most important step in building beta and alpha policy is to understand the investment objective of the portfolio. It's hard to arrive at the right answer without knowing the question!

## Accessing Fixed Interest Beta Risk and Return

Broadly speaking, the sources of return from fixed interest assets are driven by four fundamental risk factors; these being:

- **Term premium** - as described by the shape of the yield curve. This premium encompasses interest rate risk and inflation uncertainty.
  - Real interest rate risk
  - Inflation uncertainty
- **Credit premium** - risk of holding defaultable securities. This is separated into default risk and illiquidity risk.
  - Credit risk - likelihood of default
  - Illiquidity risk

While this paper does not explore the full extent of beta risk, Figure 5 shows the traditional beta sources and how they are exposed to these conceptual risk premiums. In constructing a beta portfolio the desired allocation to each of these risk premia should be carefully considered rather than just allocating to a benchmark driven product or portfolio.

Figure 5 – Risk Premiums in Traditional Beta

Beta Source	Real Interest Rate Risk	Inflation Risk	Credit Risk	Illiquidity Risk
Sovereign	X	X		
Inflation Protected Securities	X			X
Investment Grade Credit	X	X	X	X
High Yield Credit	X	X	XXX	XX
Securitised	X	X	X	X
Emerging Market Credit	X	X	XX	X

Source QIC. (X means these markets provide this beta risk source).

As shown Figure 5, some asset classes are more effective in accessing risk premia. However, it should be noted that these characteristics only reflect the generic asset class attributes and by structuring the portfolios differently from the standard, certain attributes can be enhanced.

## Physical Index Replication

As discussed, fixed Interest benchmarks commonly used by investment managers to manage physical assets often do not represent the optimal risk/return structure for investors. The full replication approach to a Fixed Interest benchmark is the lowest risk (and potentially the lowest return) approach to bond management.

Currently in the Lehman Global Aggregate portfolio, there are over 10, 000 issues. Many of these bonds were issued years ago and are consequently illiquid. Thousands of these issues are locked away in long-term bond portfolios and could only be purchased by paying extremely high prices. For this reason, full replication of a broad bond index is highly complex.

Enhanced indexing involves investing in a large sample of bonds such that the portfolio risk factors match the index risk factors (namely, cash flows, sector weights, duration, quality). This portfolio will have higher tracking error than full replication but can be implemented and maintained at much lower cost. Some investment managers estimate that owning bonds from 175 issuers will replicate the LGA with acceptable tracking error.

## Synthetic Beta Replication

Synthetic replication of fixed interest benchmarks has shown to be effective. By utilising many of the market innovations it is possible to replicate most sources of fixed interest return (including credit).

It is possible for investors to guarantee gross benchmark performance through a total return swap with an investment bank or counterparty. An investor would enter into a total return swap to

receive the return of a benchmark and in exchange would pay the local cash rate (typically plus a margin).

The cost of this replication strategy is the margin which an investor pays above the cash rate to receive this return stream. Theoretically, this cost should be equal to the cost of hedging the risk for the counterparty and as such you would expect the more illiquid and obscure benchmarks to incur a higher fee.

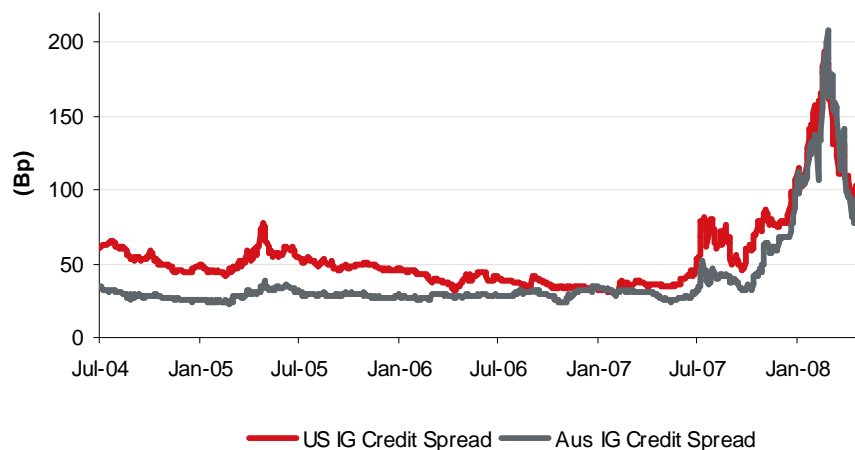
The main implication of these swaps is that you are tied to the counterparty who offers the swap (generally the owner of the benchmark) and significant counterparty credit risk exists.

It is also possible to synthetically replicate benchmark performance without the use of a total return swap. The other instruments available to synthetic beta replicators are as follows:

- Bond Futures.
- Interest Rate Futures.
- Interest Rate Swaps.
- Mortgage Futures (TBAs).
- Credit Default Swaps / Indexes (Figure 6).

Figure 6 – Credit Derivative Indices

**US and Australian Investment Grade Credit Spreads**



Source QIC.

The three main approaches to synthetically replicating benchmark performance are:

1. Stratified Sampling – divides the index into duration cells. A derivative instrument is selected for each cell in an amount to match the duration exposure of that cell.
2. Key Rate Duration – attempts to match the overall key rate duration exposures of the index. Key rate duration measures sensitivity to shifts at specific key rate points along the yield curve.

3. Minimum Variance Hedge – seeks to minimise the predicted tracking error of a replicating portfolio against its index. Therefore, the replicating portfolio will reflect the correlations between sectors and instruments in the portfolio and index. This is generally a more model driven process and less transparent than the other two methods and is reliant on the continued relationships between different risk factors.

The effective use of credit derivatives is a very effective measure to replicate credit exposure. While credit derivatives do not always mimic the returns from the physical securities, they do offer a good hedge.

## Generating Meaningful Fixed Interest Alpha

### Why Fixed Interest Alpha Is Meaningful

Instrument innovations have allowed skilled active managers the facility to generate high alpha returns for investors. It is our expectation that highly active strategies in fixed interest investments will become more prevalent as the market returns continues to disappoint.

At total fund level fixed interest alpha is meaningful because of:

- The flexibility to adjust underlying betas without disrupting alpha sources.
- Improved diversification of alpha sources with the switch to absolute return from fixed interest benchmarks.
- Low correlation to Beta.
- Greater capital efficiency with the use of derivatives and overlays (which in fixed income markets are generally liquid and have huge capacity).
- The ability to manage alpha costs including the use of derivatives to lower transaction costs and use of performance fees to align managers to client objectives.
- Alpha becomes more scaleable.

At the total client fund level, including fixed interest alpha, total alpha should be approached as a single, integrated stream of return (ideally as an absolute return above cash concept). It should form a material part of overall risk taking (at levels well above those currently embedded in typical Australian superannuation fund risk budgets). It should be unconstrained in structure and sourced from as many independent sources as is efficient. The alpha stream should be evaluated on an after-fee, after-tax basis.

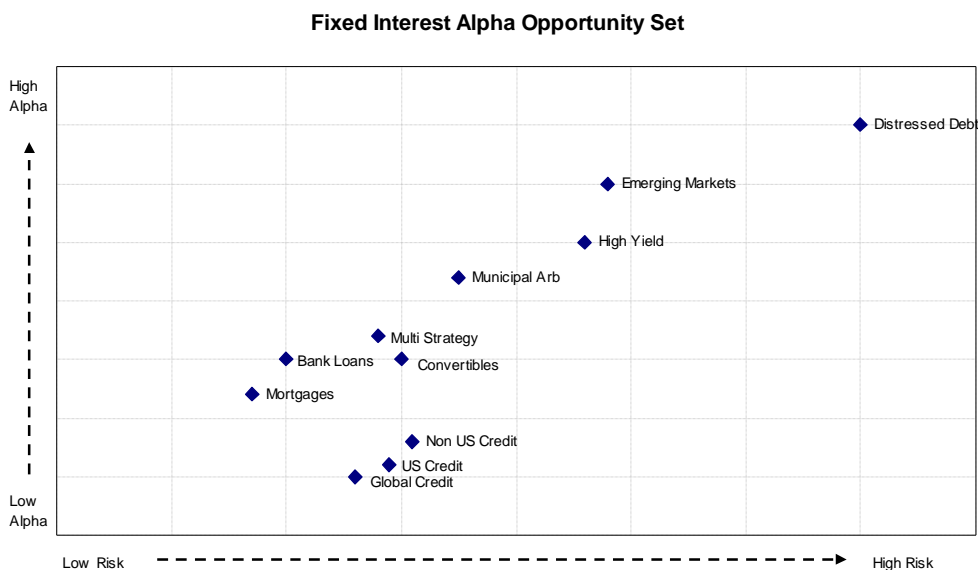
### Breadth of the Global Opportunity Set

In determining opportunities to generate meaningful alpha, fixed interest managers need to also consider a variety of fixed interest sectors via a thorough analysis of the broad global opportunity set. This analysis explores an unconstrained universe of fixed interest sectors, focusing on those opportunities where the greatest potential for alpha exists. Although the opportunity set considered

is large, it may be further expanded to incorporate a variety of additional sub sector market opportunities.

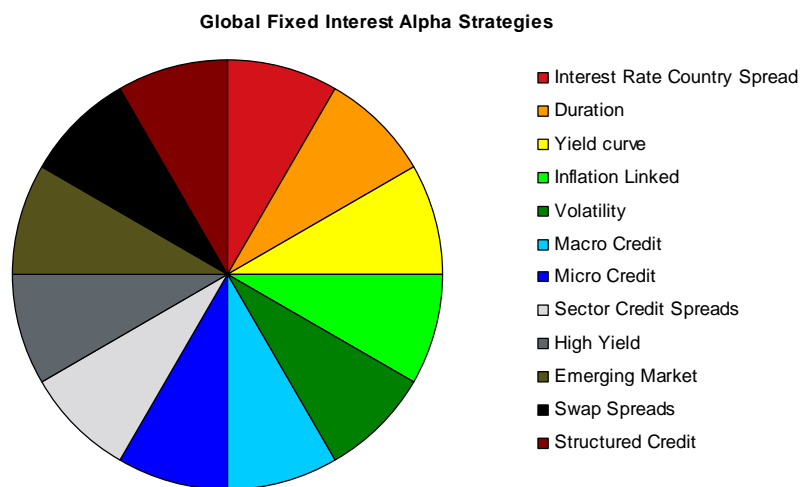
Figure 7 displays the fixed interest alpha opportunity spectrum, typically the higher the alpha the greater the risk. The alpha pie chart in Figure 8 shows the potential strategies used by a fixed interest manager to drive alpha risk budgets.

**Figure 7 – Fixed Interest Alpha Opportunity Set**



Source QIC.

**Figure 8 – Diversified Alpha Pie**



Source QIC.

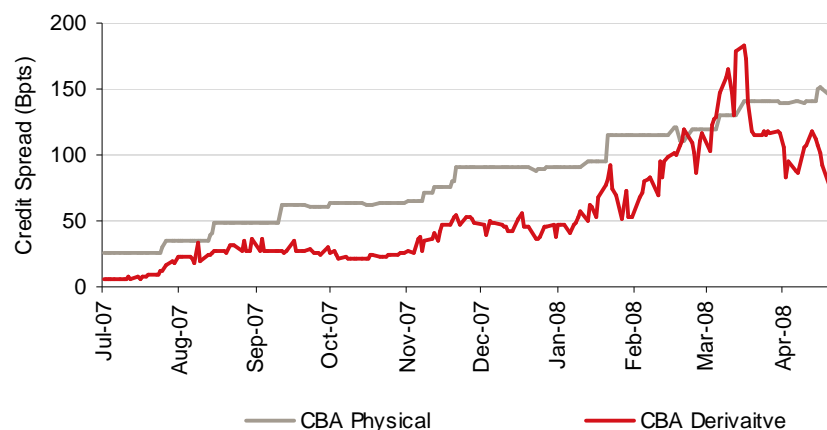
## Scalability

Scalable fixed interest is relatively easy to achieve due to the depth and liquidity of global interest rate and credit derivative markets. Implementing strategies through synthetic instruments offer a capital efficient way to access exposures with minimum of cost and low tracking error.

The derivative market allows a fixed interest manager to implement short and long positioning across country yield curves, indices and individual corporate securities.

The key risk with derivative based strategies is that the price may differ slightly from that of the underlying physical assets. An example of this is during the 2007-08 credit crisis where derivative credit spread indices and single name contracts widened very rapidly, maintained significant volatility and retraced significantly. Credit spreads on physical securities did not move with the same volatility, nor did they widen as far and are yet to retrace to the same level as the derivative contracts. This is highlighted in Figure 9 which shows the credit spread movement of Commonwealth Bank securities with similar maturity.

Figure 9 – Commonwealth Bank Physical and Synthetic Credit Spread



Source QIC.

Because of the long and short nature of the investments, alpha strategies provide broader opportunities – increased breadth and better risk and return characteristics than traditional long only strategy.

The QIC Global Fixed Interest team specialise in the generation of alpha that can be managed at either product or total Fund level for our clients. For example, an alpha overlay targets a return of 0.25% over a \$50bn client portfolio. The size of this mandate makes the team effectively the largest hedge fund manager in Australia (based on Rainmaker data).

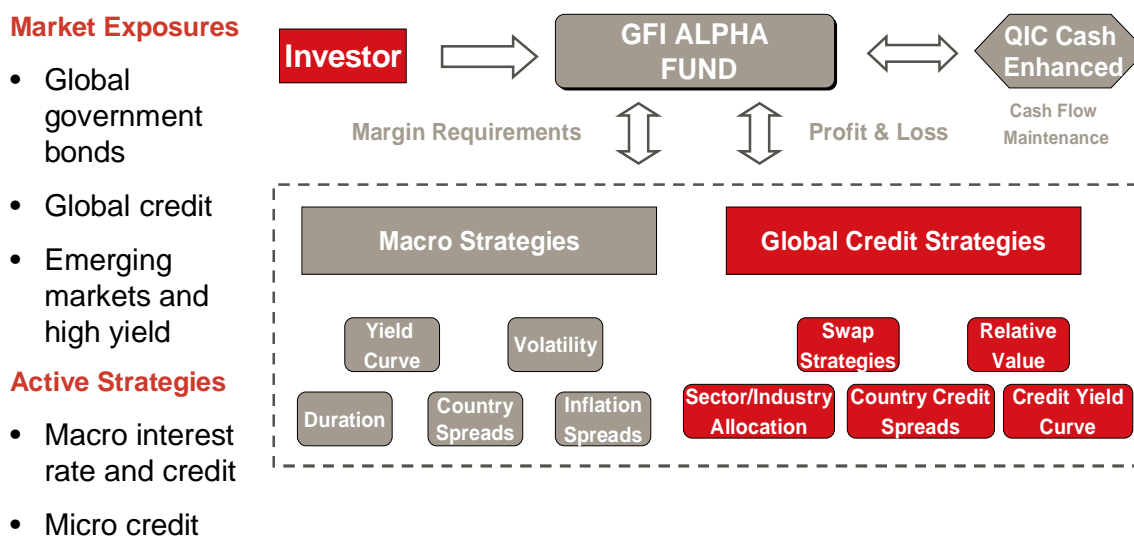
QIC is engaged in an ongoing process of seeking and exploiting a diversified range of active return strategies. At the same time, fixed interest investors are demanding more flexible structures for delivering scalable active returns.

QIC's philosophy on alpha is that it should be approached as a single, integrated stream of return that forms a material part of the overall risk budget. It should also be unconstrained in structure and obtained from as many independent sources as is efficient. This belief flows through to global fixed

interest which has evolved in complexity to include dozens of sectors and sub-sectors covering thousands of securities. Not only is there a myriad of bonds to choose from but also the rapid growth in derivatives markets has added a further level of complexity.

This separation of alpha from beta also provides an opportunity for clients to purchase alpha only. The chart below provides a simple example of how the alpha concept works. An investment of 2% of total fund assets (to cover margin requirements), would give an absolute return target of up to 0.25% at fund level above cash.

Figure 10 – Sourcing Alpha from Breadth of Alpha Opportunity Set and Long/Short Strategies



Source: QIC.

The alpha strategies are driven by derivative positions in interest rate and credit. In the above example the underlying capital is held in a cash vehicle, however the majority of the capital can be held in other assets with some cash required to fund derivative positions.

To maximise the consistency of active return, GFI's fundamental research and Scorecard process translates into a broad range of strategies that can be applied to any fixed interest portfolio. This continuous process starts with rigorous interest rate and credit research, feeds into the Scorecards which signal the magnitude of decisions to achieve a funds' return target, and is completed with risk management, portfolio construction, and market monitoring and reporting.

## Fixed Interest Alpha Correlation

Most superannuation balanced funds have significant equities risk. QIC has undertaken analysis of the correlation between fixed interest alpha with other asset classes using a fixed interest alpha proxy. This proxy is derived from the QIC Global Fixed Interest Alpha Fund and alpha overlay of the QIC Diversified Fixed Interest Fund.

Using the returns from global benchmarks, we can show that QIC global fixed interest alpha is uncorrelated to fixed interest beta, highlighting it is a pure alpha source of return. This is due to the skill of the manager to translate research and portfolio construction into alpha by taking advantages

of inefficiencies and breadth of opportunities within fixed interest markets. Figure 11 below shows that fixed interest alpha is also uncorrelated to equity beta.

This low or negative correlation to equities makes an allocation to fixed interest alpha attractive for a balanced fund as it would reduce risk at the total portfolio level.

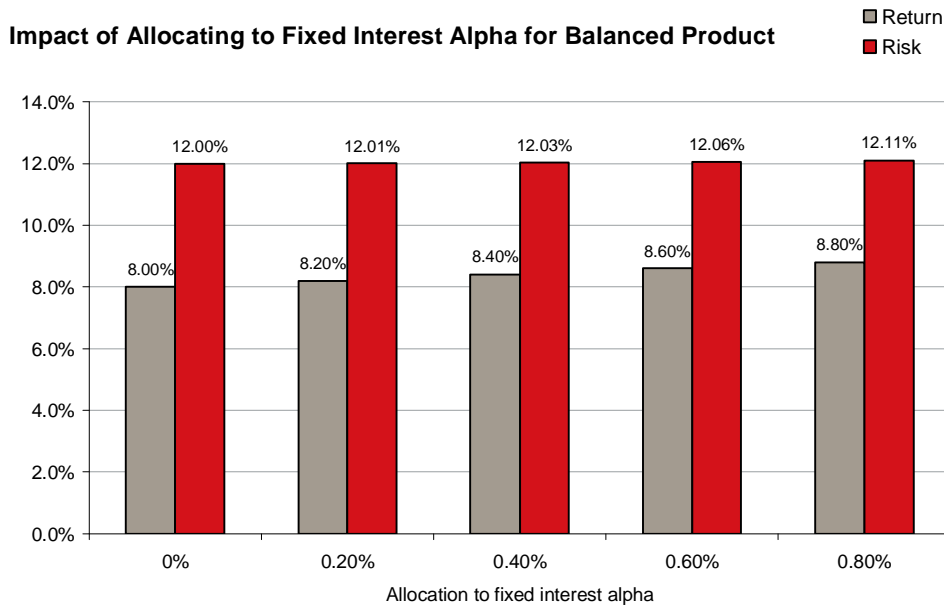
**Figure 11 – QIC Global Fixed Interest Alpha With Low/Negative Correlation With Equities**

Global Fixed Interest Alpha Correlation vs	
Australian Equities (ASX 200)	-0.09
International Equities (MSCI World Ex)	0.02
Australian Fixed Interest (UBS Comp Bond)	-0.29
International Fixed Interest (LGA)	-0.16

Source: Mercer, QIC – Based on 2004-2008 returns

Assuming a balanced fund expected return of 8.0% and volatility of 12.0%, by adding fixed interest alpha to the fund (Figure 12), the risk adjusted return profile significantly improves.

**Figure 12 – Correlation, Diversification and Risk Adjusted Return Benefits From Allocation to High Fixed Interest Alpha Product**



Source QIC.

## Driving Fixed Interest Returns Harder

The world of fixed interest has and continues to evolve to allow investors to target specific fixed interest risk premiums and structure a portfolio to effectively meet a variety of objectives including driving fixed interest returns harder.

This paper has only briefly touched on the intricacies and complexities of managing a fixed interest portfolio. The key themes touched on in this paper are:

- The importance of understanding clients' total fund objectives and structuring mandates that will deliver beta (mandate) and alpha (active) returns most effectively and efficiently. This approach of separating beta and alpha decision-making and portfolio management allows for the removals of constraints, allows for more diversification and more return with less risk.
- Fixed Interest benchmarks commonly used for investment managers often do not represent the optimal risk/return structure for investors. This is due to the fact that duration and composition is impacted by the issuers.
- Synthetic replication of fixed interest benchmarks has shown to be effective. By utilising many of the market innovations it is possible to replicate most sources of fixed interest return.
- Using market and active return as separate and flexible fixed income components of a Fund's total beta and alpha mix requires fixed interest managers to evolve alpha and beta products, demonstrate value add and align fees appropriately.
- Fixed interest alpha offers investors great opportunities to improve returns and reduce risk across their portfolio due to the lack of correlation to equity beta.
- The breadth and scalability of fixed interest markets, allow skilled managers to deliver alpha at fund level in a capital efficient manner.

While the market outlook for fixed interest remains relatively subdued, instrument innovations have allowed skilled active managers the facility to generate high alpha returns for investors. It is our expectations that highly active strategies in fixed interest investments will become more prevalent as the market return continues to disappoint.

For the traditional fixed income portfolio manager, evolving separate alpha and beta management capabilities and products, may feel revolutionary at the coalface, yet at the clients' total portfolio level this is just a better way of constructing portfolios. The alternative to this evolution for traditional fixed income management will be irrelevance.

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